PEACE/WILLISTON
FISH & WILDLIFE
COMPENSATION
PROGRAM

BC hydro

BRITISH COLUMBIA

Pesika Creek Prescribed Burn, 1993

M. D. Wood
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PWFWCP Report No. 184

The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

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INTRODUCTION

Suppression of wildfires in British Columbia to protect commercial forest resources has resulted in a decrease of young seral communities and a subsequent reduction in natural habitat diversity. Prescribed burning is a habitat modification technique used to set back the successional stage of vegetation communities, thereby increasing the amount of early seral habitats. Removal of mature overstory vegetation through burning increases both nutrient availability and the amount of sunlight penetrating the forest floor, which stimulates the regeneration of understory vegetation. These young seral communities created through burning benefit a diversity of wildlife species. The increased availability of lush forb and shrub growth provides increased forage for ungulates and bears. Standing snags created by fire attract insects, in turn providing feeding sites for woodpeckers, while an increase in coarse woody debris provides habitat for small mammals.

The Peace/Williston Fish and Wildlife Compensation Program (PWFWCP) was established in the late 1980's to enhance and protect fish and wildlife populations and their habitat throughout the Williston Reservoir watershed. To enhance winter range for forest ungulates such as moose (Alces alces) and elk (Cervus elaphus nelsonii), the PWFWCP has employed a variety of methods including prescribed burning, manual thinning, and girdling (Zemlak et al, in prep). These methods all aim to set back the successional stage of vegetation, and increase forage production, quality, and availability. Prescribed burns aimed at benefiting ungulates are typically conducted on lower elevation (<1400m) south-facing slopes dominated by mature deciduous stands, in geographic areas characterized by low snow depths. The risk of fire escape must also be low. There are limited sites within the Williston Reservoir watershed that meet these criteria: the majority of suitable sites exist along the north side of the Peace Arm in the Dawson Creek Forest District, and in the Finlay River drainage in the Mackenzie Forest District.

South-facing slopes along Pesika Creek in the Finlay River drainage were identified as suitable candidates for burning in PWFWCP's 1991 Wildlife Burning Plan for the Mackenzie Forest District (Dawson 1991). The development of mature deciduous vegetation along the north side of Pesika Creek had resulted in a relatively homogenous habitat type with limited ungulate forage production. The primary objectives of burning these south-facing slopes were to increase the proportion of early seral habitats in the area, and to improve the forage quality and availability on winter ranges used by moose, elk, Stone's sheep *(Ovis dalli stonei),* and mountain goats *(Oreamnos americanus).*

Due to the extent of overmature aspen cover, and the lack of understory vegetation and fuel to carry a fire, it was expected that the area would not burn in its entirety. The desired result was to create a mosaic of small early seral openings amidst the mature aspen, thus enhancing forage production while still providing adjacent cover. These small burned areas would then provide fuel for subsequent burns.

AREA DESCRIPTION

Pesika Creek, a tributary to the lower Finlay River, is located at the north end of the Williston Reservoir within the Mackenzie Forest District (Figure 1). The creek valley lies within the Western Muskwa Ranges ecosection in the Northern Canadian Rocky Mountains ecoregion (Demarchi 1995). Three sites along the north side of the valley were proposed for burning in 1993: Al (205 ha), A2 (291 ha), and A3 (328 ha) (Figure 2, Appendix A). These southeast-facing sites extended between 800 and 1300 m, on gentle to moderate slopes (20-30%). The majority of the burn sites were within the Boreal White and Black Spruce (BWBSdkl) biogeoclimatic zone, with the upper portions extending into the Engelmann Spruce-Subalpine Fir (ESSFmv4) zone (MacKinnon et al 1990, Ministry of Forests 1995). The BWBSdkl is a climatically dry subzone with an extensive fire history (MacKinnon et al. 1990, Meidinger and Pojar 1991). It has the least snowfall of all northern zones, and is important for wintering ungulates (Meidinger and Pojar 1991). The western portion of site Al was a deciduous/coniferous mix and the risk of fire escape there was considered to be moderate to high. Sites A2 and A3 were dominated by mature aspen *(Populus tremuloides)* with little understory vegetation, and were well protected by creek draws and ridges with a low risk of fire escape.

The Pesika Creek drainage receives low to moderate use by elk, moose, Stone's sheep and mountain goats throughout the year. The overwintering population of Rocky Mountain elk in the Pesika Creek and Akie River drainages is estimated at between 30 and 40 animals (Ritchie 1992). Summer elk populations are higher, presumed to be a result of the westward migration of animals from the east side of the Rockies. Elk translocated in February 1996 to the Ingenika River drainage (40 km southwest of Pesika Creek) may also disperse to colonize adjacent drainages such as Pesika Creek (Wood 1998). The valley bottom receives moderate use by moose in winter, while the upper slopes of over-mature aspen stands currently receive lower use. Stone's sheep and mountain goats are present at higher elevations in low numbers. Extensive, dry mineral licks used by the sheep and goats are located at the base of the targeted burn areas.

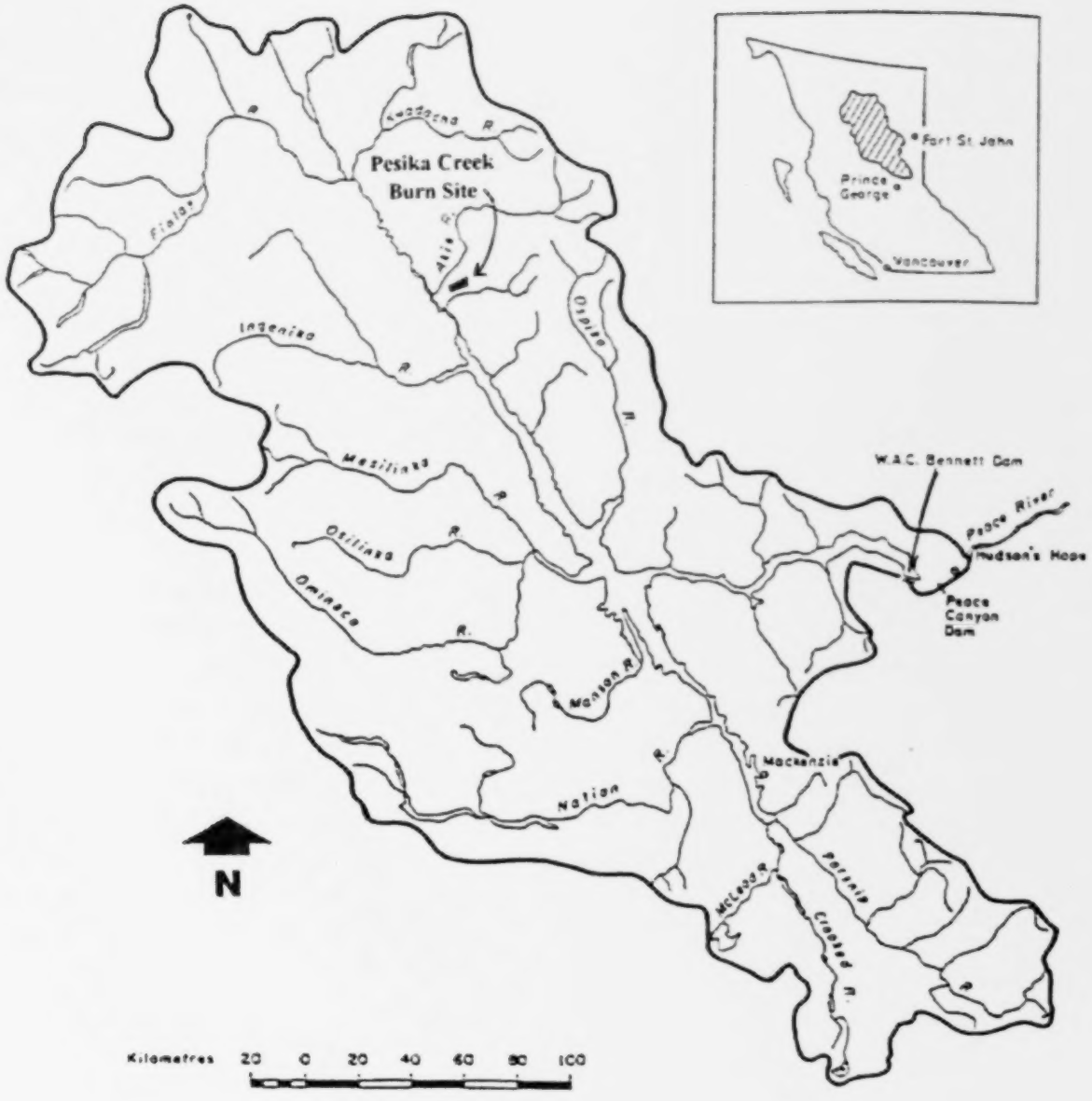

Figure 1. Location of Pesika Creek in Williston Reservoir watershed, north-central BC.

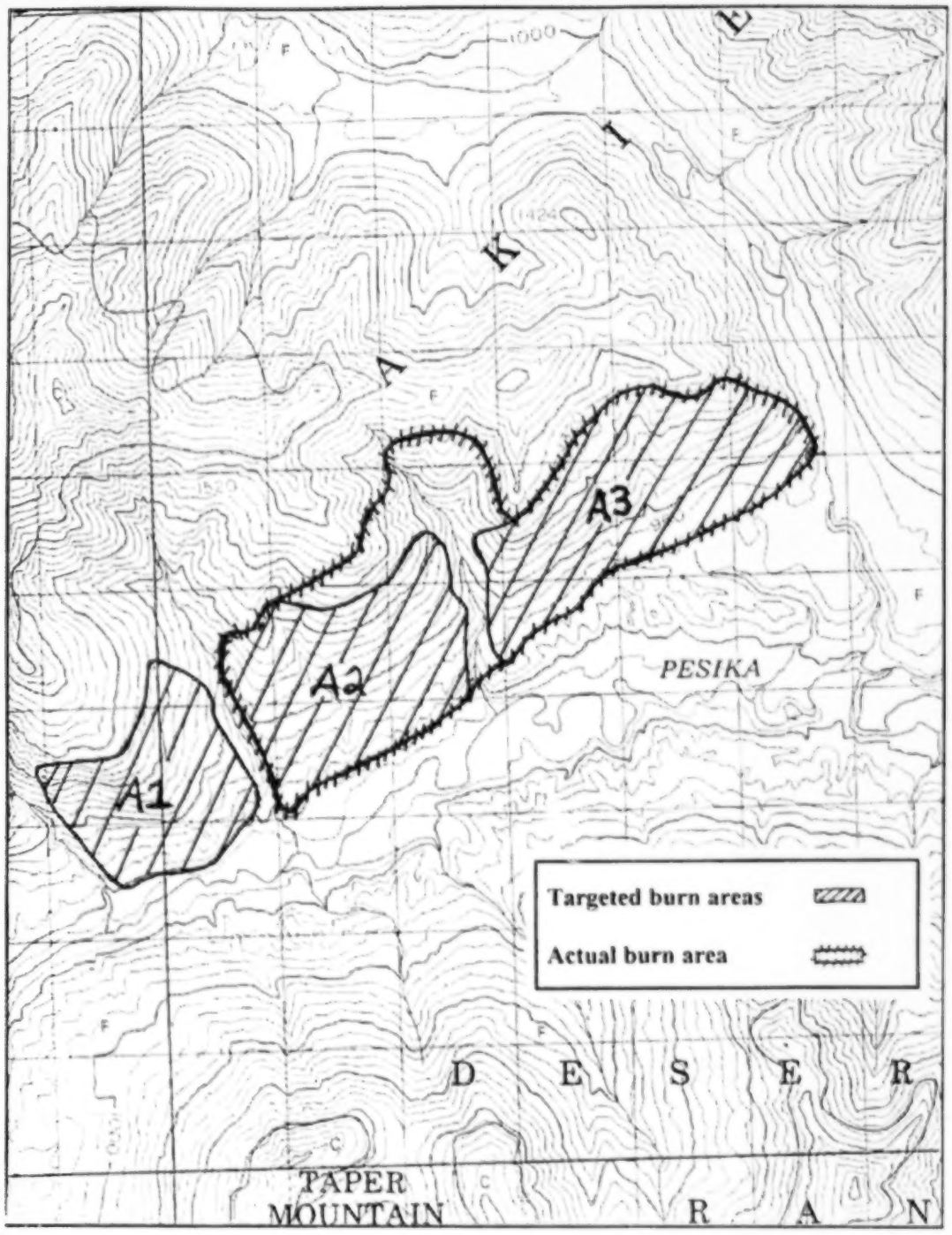

Figure 2. Location of prescribed burn sites A1, A2, and A3 in the Pesika Creek drainage.

BURN DETAILS

The prescribed burn was conducted by the PWFWCP and BC Environment on 14 May 1993, with the approval and cooperation of the Mackenzie Forest District. Prior to ignition, areas of concern around the three burn sites were inspected from the air, and a decision was made to ignite and burn only sites A2 and A3 due to concerns with the high risk of fire escape around site A1. A burning permit (#61481) was issued by the Mackenzie Forest Service, and ignition commenced between 1600 and 1630 hr. Ignition was achieved through the expulsion of Aerial Ignition Devices (AIDs) from a Bell 206 helicopter. The AIDs (small polystyrene balls filled with potassium permanganate) were fed into a dispensing machine where they were injected with glycol before being expelled from the helicopter. A thermal reaction between the chemicals causes ignition in 25-30 seconds. The perimeter of site A2 was ignited first, followed by the interior of the site through a number of parallel passes. A small conifer ridge between sites A2 and A3 was ignited next, followed by ignition of site A3 in the same manner as A2. A total of 4,000 AID's balls were released during ignition of the two sites. Weather conditions at the time of ignition were sunny and warm (21°C), with a relative humidity of 35% and a light east wind.

The AIDs created several small fires throughout the targeted burn areas; some of the small fires combined to burn larger patches. The conifer ridge between A2 and A3 burned intensely. The fire was observed to be burning under control during a post-burn monitoring flight conducted on 15 May. The burn was monitored frequently during the subsequent three days; no mop-up was required. The total cost of the burn was $11,682 (Table 1).

Table 1. May 1993 Pesika Creek prescribed burn cost breakdown.

Pre-burn Flight	Helicopter	AIDS Balls	Post-burn Monitor	Mop-up Crew	PWFWCP Staff Wages	Travel/ Accom	TOTAL
$3,350	$1,593	$550	$3,250	0	$1,986	$1,133	$11,862

BURN RESULTS

Approximately 40% (245 ha) of sites A2 and A3 burned in small patches; an additional 25 hectares on the ridge between A2 and A3 burned entirely, resulting in a total of 270 ha burned (Figure 2). In portions of A2 and A3 where the fire burned with moderate intensity, removal of the aspen overstory should result in the growth of young aspen, willows, and other shrubs which will benefit browsers, primarily moose. Although typically considered grazers, elk will also utilize shrubs and conifers when grasses become unavailable due to deep snow (Skovlin 1982). Adjacent mature conifer and deciduous stands will provide thermal and security cover for these ungulates.

The coniferous trees along the ridge between A2 and A3 were burned completely. Backmeyer et al (1992) states that the complete removal of coniferous trees is a result of highly volatile crown fuels and the vulnerability of conifers to fire kill. It is anticipated that the removal of conifers in this area will result in an area of high grass production which will benefit grazers such as Stone's sheep and elk. The stand of unburned conifers which borders the burned area will provide adjacent cover.

The initial step in meeting the objective of creating a mosaic of early seral openings amidst mature deciduous and conifer cover appears to have been achieved by the prescribed burn of sites A2 and A3 at Pesika Creek. The burn opened up some small patches throughout the mature aspen-dominated sidehill, resulting in an increase in the habitat diversity in the area that will likely benefit a wide range of wildlife species. Fuel loads in the area are also expected to increase as fire-killed trees decay and fall, enabling subsequent prescribed burns to achieve greater burn coverage and result in larger early seral areas.

PRESCRIBED BURN MONITORING

The PWFWCP attempts to conduct prescribed burns on an annual or bi-annual basis, alternating between the Mackenzie and Dawson Creek Forest Districts. The response of vegetation to these prescribed fires is being monitored by the PWFWCP at 3 representative sites throughout the Williston Reservoir watershed (Table 2). No post-burn monitoring is scheduled to be conducted at the Pesika Creek site.

Table 2. Prescribed burn monitoring sites in the Williston Reservoir watershed

BURN SITE	FOREST DISTRICT	BGC ZONE	STAND TYPE
Branham Slide	Dawson Creek F.D.	BWBSmwl	Aspen
Pelly Lake	Mackenzie F. D. (North)	BWBSdkl	Conifer
Bevel Creek	Mackenzie F. D. (South)	SBSmk2/wk2	Aspen

The Pelly Lake prescribed burn, 35 km west of Pesika Creek, was also conducted in 1993, and was selected for monitoring in the northern portion of the Mackenzie Forest District. The Pelly fire was a high intensity conifer burn that resulted in complete burn coverage of the area (Wood 1996). Long-term vegetation monitoring began at the Pelly site in August 1993.

RECOMMENDATIONS

A reburn of sites A2 and A3 should be considered within 5-7 years (1998-2000). Increased fuel loads as a result of debris from the 1993 burn should enable subsequent burns to create larger openings in the mature aspen forest. To manage the Pesika Creek drainage for a greater diversity and abundance of wildlife species, creation of a mosaic of seral and climax vegetation communities through a series of prescribed burns is recommended.

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APPENDIX A: PESIKA CREEK PRESCRIBED BURN PROPOSALS

WILLISTON WILDLIFE COMPENSATION PROGRAM

PRESCRIBED BURNING PROPOSAL

Objectives: Wildlife habitat enhancement - burn south facing deciduous sidehill to set back successional stage and increase forage availability.

Location: **PESIKA CREEK**, A1, east of Finlay River, below Akie Mtn.
Site Size: 205 ha
Mapsheets: 94F/2, 94F.006 M. U.: 7-41

Site Description:

Elevation: 800-1300 m Slope: 30-40% Aspect: SE
Nearest water source: Finlay River, approx. 8 km to the west
Prevailing winds: Forest Cover: Al 10, P1AS420
Wildlife rating: Class 3 ungulate range
Comments: Currently receives low use by moose, Stone's sheep, mountain goats, and elk. There is an overwintering population of about 30 to 40 elk in the Akie and Pesika drainages. Summer populations are higher resulting from the westward migration of elk from the headwaters of the Muskwa and Prophet rivers. Adjacent riparian areas receive moderate use by moose. By enhancing ungulate winter ranges, the area has the potential to support moderate use by all species. Extensive mineral licks occur along the north shore of Pesika Creek at the base of A2 and A3.

Burning Strategy:

The area has a low to moderate risk of fire escape. It is well protected by a creek draw to the east. The target area identified (see map and photos) is deciduous, while the western portion of Al is conifer/deciduous mixed and may be more of a concern from a control standpoint. Helipads may be needed on the ridge in the middle of the containment area if the western portion is a concern, and possible along the top of the burn area. Preburn same day as main burn. Burning efforts should be concentrated first on sites A3 and A2.

Other Information:

Helipads will be constructed prior to any burning commencement. All helicopter costs associated with the lighting, mop-up, and monitoring of the burns will be borne by the Williston Wildlife Compensation Program (WWCP). Mari Wood (WWCP biologist) will participate in the pre-burn surveys, and will be on site at the time of burning. The burning permit will be signed by Ministry of Environment, Lands and Parks (Wildlife Branch) contact person Glen Watts. Glen will also be on site at the time of burning.

WILLISTON WILDLIFE COMPENSATION PROGRAM

PRESCRIBED BURNING PROPOSAL

Objectives: Wildlife habitat enhancement - burn south facing deciduous sidehill to set back successional stage and increase forage availability.

Location: **PESIKA CREEK**, A2, east of Finlay River, below Akie Mtn
Site Size: 291 ha
Mapsheet: 94F/2, 94F.006 M. U.: 7-41

Site Description:

Elevation: 800-1300 m Slope: 20-30% Aspect: SE
Nearest water source: Finlay River, approx. 10 km to the west
Prevailing winds: Forest Cover: Al 10, P1AS420
Wildlife rating: Class 3 ungulate range
Comments: Currently receives low use by elk, moose, mountain sheep and mountain goats. There is an overwintering population of about 30 to 40 elk in the Akie and Pesika drainages. Summer populations are higher resulting from the westward migration of elk from the headwaters of the Muskwa and Prophet rivers. Adjacent riparian areas receive moderate use by moose. By enhancing ungulate winter ranges, the area has the potential to support moderate use by all species. Extensive mineral licks occur along the north shore of Pesika Creek at the base of A2 and A3.

Burning Strategy:

The area has a relatively low risk of fire escape; the area is well protected by creek draws and ridges. Helipads may need to be constructed near the top of the western portion if MoF desires. Preburn same day as main burn. Burning efforts should concentrate on sites A3 and A2.

Other Information:

Helipads will be constructed prior to any burning commencement. All helicopter costs associated with the lighting, mop-up, and monitoring of the burns will be borne by the Williston Wildlife Compensation Program (WWCP). Mari Wood (WWCP biologist) will participate in the pre-burn surveys, and will be on site at the time of burning. The burning permit will be signed by Ministry of Environment, Lands and Parks (Wildlife Branch) contact person Glen Watts. Glen will also be on site at the time of burning.

WILLISTON WILDLIFE COMPENSATION PROGRAM

PRESCRIBED BURNING PROPOSAL

Objectives: Wildlife habitat enhancement - burn south facing deciduous sidehill to set back successional stage and increase forage availability.

Location: **PESIKA CREEK**, A3, southeast of Akie Mtn
Site Size: 328 ha
Mapsheet: 94F/2, 94F.006 M. U.: 7-41

Site Description:

Elevation: 880-1300 m Slope: 20-30% Aspect: SSE
Nearest water source: Finlay River, approx. 12 km to the west
Prevailing winds: Forest Cover: A110, P1AS42Q
Wildlife rating: Class 3 ungulate range
Comments: Currently receives low to moderate use by moose and elk, and low use by Stone's sheep and mountain goats. There is an overwintering population of about 30 to 40 elk in the Akie and Pesika drainages. Summer populations are higher resulting from the westward migration of elk from the headwaters of the Muskwa and Prophet rivers. Adjacent riparian areas receive moderate use by moose and elk. By enhancing ungulate winter ranges, the area has the potential to support moderate use by all species. Extensive mineral licks occur along the north shore of Pesika Creek at the base of A2 and A3.

Burning Strategy:

A3 is the largest of the three burn areas along the north shore of the Pesika River. The area has a low risk of fire escape; the area is very well protected by creek draws and ridges. Preburn same day as main burn. Light up should probably begin on this site, then proceed to A2 and Al respectively if conditions are good.

Other Information:

Helipads will be constructed prior to any burning commencement. All helicopter costs associated with the lighting, mop-up, and monitoring of the burns will be borne by the Williston Wildlife Compensation Program (WWCP). Mari Wood (WWCP biologist) will participate in the pre-burn surveys, and will be on site at the time of burning. The burning permit will be signed by Ministry of Environment, Lands and Parks (Wildlife Branch) contact person Glen Watts. Glen will also be on site at the time of burning.